



IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In Re Application of:
STICKLER, ET AL.

Serial No.: 09/736,615

Filed: December, 14, 2000

For: **PRINTED CIRCUIT
BOARD LAYOUT**

Atty Dkt: HP-10007356

Group Art Unit: 2841

Examiner: J. Alcala

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AMENDMENT IN RESPONSE TO 10/24/01 OFFICE ACTION

Assistant Commissioner for Patents
Washington, D.C. 20231

Dear Sir:

In response to the office action mailed October 24, 2001, please
amend the above application as follows:

In the Specification

Please replace the paragraph beginning on page 1, line 4, with the
following rewritten paragraph:

--The present application is related to U. S. Patent Application Serial
No. 09/737189 of Lisa Ann Caselli et al. for COMPUTER PRINTED
CIRCUIT SYSTEM BOARD WITH LVD DEVICE DIRECT CONNECTOR,
Attorney Docket No. 10007352-1, filed December 14, 2000, which is
hereby incorporated by reference for all that it discloses.--

REMARKS

The specification has been amended to correct an informality. All of the claims remain in the application unchanged. Reexamination and reconsideration are requested.

Claims 7, 10 and 12-18 have been withdrawn from consideration by the Examiner, so far as applicants can determine, based upon the claims rejected and discussed in the body of the office action and applicants have responded accordingly. However both the office action summary sheet and page 2, paragraph 1 contain statements contradictory to this determination and accordingly confirmation of applicants' above determination is respectfully requested.

The drawing is objected to for failing to include reference numeral 144 in Figure 4. Applicants' proposed drawing correction to overcome this objection is indicated on the red lined mark up of Figure 4 which is submitted herewith for the Examiner's approval.

The first paragraph of the first page of the specification has been rewritten to include the serial number and filing date of a referenced application pursuant to the Examiner's request. Accordingly all objections to the specification are believed overcome.

35 USC 103 Claim Rejections

Claims 1-5, 8 and 11 stand rejected under 35 USC 103(a) as being unpatentable over Nakatani et al. (U.S. Patent No. 5,449,863). Claims 6 and 9 stand rejected under 35 USC 103(a) as being unpatentable over Nakatani et al. (U.S. Patent No. 5,449,863) in view of Leigh et al. (U.S. Patent No. 5,764,489). Applicants respectfully traverse both rejections.

Legal Basis for Obviousness under 35 U.S.C. 103

The test for obviousness under 35 U.S.C. 103 is whether the claimed invention would have been obvious to those skilled in the art in light of the knowledge made available by the reference or references. In re Donovan, 184 USPQ 414, 420, n. 3 (CCPA 1975). It requires consideration of the entirety of the disclosures of the references. In re

Rinehart, 189 USPQ 143, 146 (CCPA 1976). All limitations of the Claims must be considered. In re Boe, 184 USPQ 38, 40 (CCPA 1974). In making a determination as to obviousness, the references must be read without benefit of applicants' teachings. In re Meng, 181 USPQ 94, 97 (CCPA 1974). In addition, the propriety of a Section 103 rejection is to be determined by whether the reference teachings appear to be sufficient for one of ordinary skill in the relevant art having the references before him to make the proposed substitution, combination, or other modifications. In re Lintner, 173 USPQ 560, 562 (CCPA 1972).

A basic mandate inherent in Section 103 is that a piecemeal reconstruction of prior art patents shall not be the basis for a holding of obviousness. It is impermissible within the framework of Section 103 to pick and choose from any one reference only so much of it as will support a given position, to the exclusion of other parts necessary to the full appreciation of what such reference fairly suggests to one of ordinary skill in the art. In re Kamm, 172 USPQ 298, 301-302 (CCPA 1972).

It is impermissible for the Examiner to use "hindsight" occasioned by the applicants teaching to hunt through the prior art for the claimed elements and combine them as claimed. In re Zurko 42 USPQ 2d 1476 (Fed. Cir. 1997) In re Vaeck 20 USPQ 2d 1438 (Fed. Cir. 1991).

The fact that inventions of the references and of applicants may be directed to concepts for solving the same problem does not serve as a basis for arbitrarily choosing elements from references to attempt to fashion applicants' claimed invention. In re Donovan, 184 USPQ 414, 420 (CCPA 1975). It is also clearly established in the case law that a change in the mode of operation of a device which renders that device inoperative for its stated utility as set forth in the cited reference renders the reference improper for use to support an obviousness-type rejection predicated on such a change. See In re Gordon 221 USPQ 1125 (Fed. Cir. 1984), e.g. Diamond International Corp. v. Walterhoefer, 289 F.Supp. 550, 159 USPQ 452, 460-61 (D.Md. 1968); Ex parte Weber, 154 USPQ 491, 492 (Bd.App. 1967). In addition, any attempt to combine the teaching of one reference with that of another in such a manner as to render the invention of the first reference

inoperative is not permissible. See, e.g., Ex parte Hartmann, 186 USPQ 366 (Bd.App. 1974); and Ex parte Sternau, 155 USPQ 733.

Obviousness cannot be established by combining the teachings of the prior art to produce the claimed invention absent some teaching, suggestion or incentive supporting the combination. ACS Hospital systems Inc. v Montefiore Hospital 221 USPQ 929, 933 (Fed. Cir. 1984).

It is the invention as a whole that must be considered in obviousness determinations. The invention as a whole embraces the structure, its properties, and the problem it solves. See, e.g., Cable Electric Products, Inc. v. Genmark, Inc., 770 F.2d 1015, 1025, 226 USPQ 881, 886 (Fed. Cir. 1985)

The determination of whether a novel structure is or is not "obvious" requires cognizance of the properties of that structure and the problem which it solves, viewed in light of the teachings of the prior art. See, e.g., In re Rinehart, 531 F.2d 1048, 1054, 189 USPQ 143, 149 (CCPA 1976) (the particular problem facing the inventor must be considered in determining obviousness); see also Lindemann Maschinenfabrik GmbH v. American Hoist and Derrick Co., 730 F.2d 1452, 1462, 221 USPQ 481, 488 (Fed. Cir. 1984) (it is error to focus "solely on the product created, rather than on the obviousness or notoriousness of its creation") (quoting General Motors Corp. v. U.S. Int'l Trade Comm'n, 687 F.2d 476, 483, 215 USPQ 484, 489 (CCPA 1982), cert. denied, 459 U.S. 1105 (1983).

A patentable invention may be in the discovery of the source of the problem even though the remedy may be obvious once the source of the problem is identified. This is part of the "subject matter as a whole" which should always be considered in determining the obviousness of an invention under 35 U.S.C. 103. In re Zurko 42 USPQ 2d 1476 (Fed. Cir. 1997).

A reference which teaches away from the applicants' invention may not properly be used in framing a 35 U.S.C. 103 rejection of applicants' claims. See United States v. Adams, 148 USPQ 429 (Sup. Ct. 1966). In re Dow Chemical Co., 5 USPQ 2d 1529 (Fed. Cir.) 1988).

BACKGROUND OF THE INVENTION

"A printed circuit system board (PCSB) is a printed circuit board used in a computer which contains the computer central processing unit (CPU) and is thus the primary circuit board of the computer. A printed circuit board is a device used for interconnecting separate circuitry, electrical components and devices used by a computer. A common standard used for computer input/output (I/O) communications is Low Voltage Differential (LVD) Small Computer Systems Interface (SCSI). (There are various types of SCSI buses other than LVD SCSI buses but it is to be understood that any reference to "SCSI" in this patent application, unless otherwise indicated, is a reference to LVD SCSI.) A typical LVD SCSI bus found on a PCSB includes a LVD SCSI controller device such as an ASIC which is mounted on one surface layer of the PCSB. The SCSI controller controls the LVD SCSI signals sent between the computer's CPU and SCSI devices, such as hard drives, DVD drives, etc., which are connected to the SCSI bus. In currently used PCSB's the LVD SCSI bus includes a number of signal traces or conductors which extend between the SCSI controller and a cable connector device mounted on the PCSB. The cable connector device is adapted to matingly receive a coupling member provided on one end of a computer cable. The other end of the computer cable is provided with another coupling member that is adapted to be attached to a cable connector mounted on a smaller, auxiliary, printed circuit board usually called a "back plane." The auxiliary circuit board includes a series of signal traces which extend from the cable connector to one or more SCSI device connectors mounted on the back plane. The LVD SCSI device connector on the back plane may be a direct connector such as SCA-2 connector to which a LVD SCSI device may be directly mounted. The back plane further includes LVD SCSI terminator devices to which end portions of the SCSI traces are connected after connection thereof to the last direct connector. The terminators are active circuit devices which prevent signal reflection, etc.

Applicants have discovered that in LVD SCSI buses that certain signals which are not actively driven low, namely the RESET, SELECT and BUSY signals, are particularly subject to electrical interference

problems which may degrade the performance of the LVD SCSI bus."

(page 1, line 15--page 2, line 26)

The Invention of Claim 1

Applicants' claim 1 is directed to:

A PCSB assembly comprising:

a PCSB;

a first plurality of LVD SCSI bus signal trace pairs formed in said PCSB; and

a second plurality of LVD SCSI bus signal trace pairs formed in said PCSB and positioned next adjacent one another for the entire length thereof comprising a RESET signal trace pair, a SELECT signal trace pair and a BUSY signal trace pair.

Nakatani et al. (U.S. Patent 5,449,863) discloses:

FIG. 10 shows a printed circuit board which is still another embodiment of this invention. First, the circuit pattern as shown in the figure is formed on the surface of substrate 1, which is made of an insulation material such as epoxy resin, phenol resin, glass fiber or ceramics. The circuit pattern includes the signal pattern 20, and the ground pattern 21. These patterns are formed by well known photolithography techniques. After the required patterns are formed, the undercoat layer 4 is formed, leaving partial area A of the ground pattern 21. This undercoat layer 4 is a solder resist layer made of a resin insulation material. It is desirable that the exposed area A of the ground pattern 21 be formed on several places on the substrate. It must be formed at least on one place. This undercoat layer 4 can be formed easily by screen printing processes. After the undercoat layer 4 is formed, the conductive paste layer 5 for shielding is formed by screen printing processes. In this of embodiment this conductive paste layer 5 is made of copper paste and covers almost the whole area of the undercoat layer 4.

After the conductive paste layer 5 is applied, it is heated to cure. Then the overcoat layer 6, which is made an insulation resin material is formed on the whole upper surface of the substrate 1. This overcoat layer 6 can be made of the same material as that of the undercoat layer 4. It can be easily formed by the screen printing process together with the conductive paste layer 5 and the undercoat layer 4. (Column 13, lines 46-66)

Nakatani et al. does not, at least, disclose:

A PCSB assembly comprising:

a PCSB;

a first plurality of LVD SCSI bus signal trace pairs formed in said PCSB; and

a second plurality of LVD SCSI bus signal trace pairs formed in said PCSB and positioned next adjacent one another for the entire



length thereof comprising a RESET signal trace pair, a SELECT signal trace pair and a BUSY signal trace pair.

The above indicated differences between Nakatani et al. and applicants' invention are not obvious differences. Applicants' invention is not directed to all PCSB assemblies. Rather it is directed to a particular type of PCSB assembly with an LVD SCSI bus that has its own unique problems. **Applicants discovered the source of certain problems experienced with LVD SCSI buses** and explained it in their patent application. They also discovered how to solve these problems and explained their solution in their patent application. Neither the discovery of the problem source nor the solution of the problem was obvious from the prior art at the time applicants made their invention.

Applicants' **discovery** that the source of certain interference problems experienced with LVD SCSI buses was caused by the RESET, SELECT and BUSY signal trace pairs was not obvious. Nothing in the prior art discloses or suggests awareness of the source of this problem. A patentable invention may be in the discovery of the source of the problem even though the remedy may be obvious once the source of the problem is identified. This is part of the "subject matter as a whole" which should always be considered in determining the obviousness of an invention under 35 U.S.C. 103. In re Zurko 42 USPQ 2d 1476 (Fed. Cir. 1997).

Even if, assuming for the sake of argument, that the source of the problem discovered by applicant had been known, applicants' unique structure for solving this problem would even then not have been obvious. However given the fact that the source of the problem appreciated by applicants was not known in the art, there clearly could be no teaching, suggestion or motivation in the art to cause a person with ordinary skill in the art to provide: **a second plurality of LVD SCSI bus signal trace pairs formed in said PCSB and positioned next adjacent one another for the entire length thereof comprising a RESET signal trace pair, a SELECT signal trace pair and a BUSY signal trace pair.**

Since Nakatani et al. does not even disclose **a RESET signal trace pair, a SELECT signal trace pair or a BUSY signal trace pair** it is inconceivable that anyone who had not read applicants disclosure would be

motivated to modify the structure of Nakatani et al. in a way to produce applicants' claimed structure. (For that matter it is not even clear that a person who had read applicants' disclosure could modify Nakatani et al. to provide applicants claimed structure without rendering the Nakatani et al. device inoperative for its intended purpose. Nakatani et al does not even include a LVD SCSI bus.) Accordingly Nakatani et al. does not render claim 1 obvious, and thus claim 1 is believed to be allowable.

The Examiner indicates that the features a **second plurality of LVD SCSI bus signal trace pairs formed in said PCSB and positioned next adjacent one another for the entire length thereof comprising a RESET signal trace pair, a SELECT signal trace pair and a BUSY signal trace pair** are intended use limitations which cannot be used to differentiate the claim from the prior art, relying on Ex parte Masham, 2 USPQ 2d 1647 (1987 Bd. App.) as authority. Applicants respectfully traverse. The recited features from applicants claim are structures, not intended uses. For example a RESET signal trace is a physical feature formed on a PCSB that carries a particular type of signal. The case relied on by the Examiner is inapposite. It deals with a mixing device having claim elements which were all identical to the features of a prior art apparatus with the only difference being that the mixer of the claim is specified to mix a material different than that mixed by the prior art mixer. But applicants are not claiming a PCSB with features identical to a prior art structure. Instead applicants are claiming a device that has physical features, particular types of signal traces, that are different from and that are arranged differently from the structures of the applied reference. If the Examiner's extrapolation of Masham were correct then there could be no patents granted on any new electrical/electronic device since every such device, following the Examiner's logic, differs from earlier devices merely in the "intended use" of known electrical/electronic elements such as conductors, resistors, capacitors, transistors, etc. The fact that thousands of patents have been granted on new electrical/electronic devices based upon new arrangements or new functions of such features demonstrates the error of the Examiner's position. Applicants also traverse the Examiner's Statement: "It is well known in the art to use low voltage



differential signal traces to reduce noise....” Accordingly the Examiner must produce a reference to support this allegation , even though their appears to be no nexus between this statement and the rejection.

Claim 11 is believed allowable because Nakatani et al. neither discloses nor suggests, at least:

A PCSB comprising;

a first surface layer comprising a **plurality of LVD SCSI bus signal trace pairs**; and

a second surface layer opposite said first surface layer comprising at least a portion of at least one signal trace pair selected from the group of: a LVD SCSI bus RESET signal trace pair; a LVD SCSI bus SELECT signal trace pair and a LVD SCSI bus BUSY signal trace pair; and excluding all LVD SCSI bus signal trace pairs other than those in said group.

Claims 6 and 9 stand rejected under 35 USC 103(a) as being unpatentable over Nakatani et al in view of Leigh et al. (U.S. Patent No. 5,764,863).

Leigh et al. (U.S. Patent No. 5,764,863) discloses:

The present invention relates to the placement of signal traces on a two-sided printed circuit board such that impedance of the traces is controlled and so that the number of power and ground pins required on an integrated circuit are minimized.
(Abstract)

Leigh et al. discloses or suggests nothing to overcome the deficiencies of Nakatani et al. with regard to claim 1, the independent base claim for both claims 6 and 9. Accordingly claims 6 and 9 are believed allowable as depending from an allowable base claim and further in view of the novel and nonobvious features and combinations set forth therein.

Claims 2-5, and 8 which have claim 1 as a base claim are believed allowable as depending from an allowable base claim and are believed allowable on further independent grounds in view of the novel and nonobvious features and combinations set forth therein.

In view of the above, all of the claims are now believed to be in condition for allowance. Reexamination and reconsideration are requested.

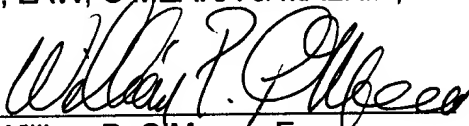
Attached hereto is a marked up version of the changes made to the specification by the current amendment. The attached page is captioned **"VERSION WITH MARKINGS TO SHOW CHANGES MADE"**.

Dated: Jan 16, 2002

Respectfully submitted,

KLAAS, LAW, O'MEARA & MALKIN, P.C.

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